

# Project Fact Sheet



## ***Energy Efficiency through Soil Compaction and Moisture Profile Sensor Development***

### **GOALS**

- To develop a soil compaction and moisture profile sensor and integrate it with the GPS system,
- To conduct field tests to evaluate the effectiveness of this sensor in determining the soil compaction and moisture profile,
- To conduct extensive field tests to relate soil compaction and moisture variability to infiltration variability and yield variability.
- To evaluate the effect of infiltration variability on irrigation uniformity and its implication on irrigation management.

### **PROJECT DESCRIPTION**

With the development of the soil compaction/moisture sensor, the researchers will demonstrate the relationship between infiltration variability, soil compaction, and moisture profile variability. In addition, irrigation uniformity and yield variability will also be demonstrated. This project will develop ideas and techniques to enhance irrigation uniformity, conserve water, and reduce pumping energy requirements. At the completion of this project the researchers expect to complete the development and field verification of a

soil compaction and moisture profile sensor and show its usefulness in mapping infiltration variability and managing irrigation uniformity. In addition, the researchers will have developed techniques to enhance irrigation uniformity, conserve water, and reduce pumping energy costs. Before commercialization can be realized, the researchers will need to demonstrate these methods at selected farm sites.



**Field Tests**

## **BENEFITS TO CALIFORNIA**

Potential energy benefits to be gained from this research are at least 10% savings in water resulting in 3.25 trillion Btu/per year or the equivalent of 952 million kWh/yr. as a result of water conservation using the soil compaction and moisture sensor technology for irrigation.

## **FUNDING AMOUNT**

**California Energy Commission: \$168,677**

## **PROJECT STATUS**

Completed the fabrication and testing of the electronic soil compaction tool. A second generation device was fabricated with additional sensors to interact with the GPS and GIS technologies. All previous results are consistent for this new device. The GPS system will be installed to interface to the new unit to start mapping both cone index and profile sensor outputs. The University of California has started the process to patent this new equipment. The John Deere Company has expressed interest to incorporate this technology into their advanced precision tillage equipment.

## **FOR MORE INFORMATION**

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